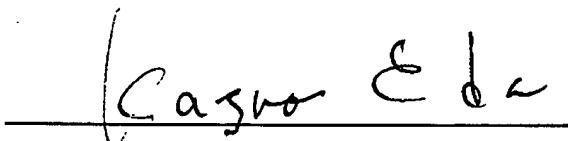


DECLARATION

I, Kazuo Eda, residing at 7th Fl., Shuwa Kioicho Park Bldg., 3-6, Kioicho, Chiyoda-ku, Tokyo 102-0094, Japan, hereby declare that I have a thorough knowledge of Japanese and English languages, and that the attached pages contain correct translation into English of the application document of Japanese Patent Application No. 2000-221238 filed on July 21, 2000 in the name of CANON KABUSHIKI KAISHA.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 20th day of July, 2005.

  
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Kazuo Eda

Translation of Japanese Patent Application No. 2000-221238

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PRINTING APPARATUS AND INFORMATION PROCESSING  
APPARATUS, CONTROL METHOD AND STORAGE MEDIUM

5 [What Is Claimed Is:]

[Claim 1]

A printing apparatus for printing an image on a predetermined recording medium based on a print job received from a higher-order apparatus, comprising:

10 instruction means for issuing a print cancel instruction;

searching means for, when the print cancel instruction is issued during the print processing based on the print job, searching a predetermined data 15 indicating the end of job among print data, which has not been processed, received after the reception of currently-processed data; and

control means for deleting print data received before the reception of the predetermined data searched 20 by said searching means, and for stopping print processing of the interested job.

[Claim 2]

The apparatus according to claim 1, wherein said searching means searches in a reception buffer.

25 [Claim 3]

The apparatus according to claim 1, further comprising means for, in response to the print cancel

instruction, notifying an originator, which had generated the print job, of the print job.

[Claim 4]

5       A control method of a printing apparatus for printing an image on a predetermined recording medium based on a print job received from a higher-order apparatus, comprising:

10      a searching step of, when the print cancel instruction is issued by said instruction means during the print processing based on a print job, searching a predetermined data indicating the end of job among print data, which has not been processed, received after the reception of currently-processed data; and

15      a control step of deleting print data received before the reception of the predetermined data searched by said searching means, and of terminating print processing of the interested job.

[Claim 5]

20      An information processing apparatus for issuing a print job and outputting the job to a printing apparatus according to claim 3, comprising:

25      determination means for, while generating print data for said printing apparatus based on delivered data to be printed from a higher-order processing and outputting the print data, determining whether or not a notification of print cancellation has been received;

means for, in a case where said determination means determines that the notification of print cancellation has been received, stopping generation of the print data and outputting said predetermined data 5 indicating the end of job to said printing apparatus.

[Claim 6]

A control method of controlling an information processing apparatus for issuing a print job and outputting the job to a printing apparatus according to 10 claim 3, comprising:

a determination step of, while generating print data for said printing apparatus based on delivered data to be printed from a higher-order processing and outputting the print data, determining whether or not a 15 notification of print cancellation has been received;

a step of, in a case where said determination step determines that the notification of print cancellation has been received, stopping generation of the print data and outputting said predetermined data 20 indicating the end of job to said printing apparatus.

[Claim 7]

A storage medium storing printer driver program, which is to be installed into a host computer, for a printing apparatus according to claim 3, comprising:

25 a program code for a determination step of, while generating print data for said printing apparatus based on delivered data to be printed from a higher-order

processing and outputting the print data, determining whether or not a notification of print cancellation has been received;

5. a program code for a step of, in a case where said determination step determines that the notification of print cancellation has been received, stopping generation of the print data and outputting said predetermined data indicating the end of job to said printing apparatus.

10 [Claim 8]

A information processing apparatus comprising:  
determination means for, while generating print data, determining whether or not a notification of print cancellation has been received from a printer;

15 means for generating print data in a case where said determination means determines that the notification of print cancellation has not been received, and for stopping generation of the print data and adding data indicating the end of job in a case  
20 where said determination means determines that the notification of print cancellation has been received.

[Claim 9]

The apparatus according to claim 8, wherein said printer deletes print data received from the apparatus  
25 until receiving data indicating the end of job after notifying the apparatus of the cancellation of print job.

[Claim 10]

A information processing method comprising:  
a determination step of, while generating print data, determining whether or not a notification of print cancellation has been received from a printer;  
a step of generating print data in a case where said determination step determines that the notification of print cancellation has not been received, and of stopping generation of the print data and adding data indicating the end of job in a case where said determination step determines that the notification of print cancellation has been received.

[Claim 11]

The method according to claim 10, wherein said printer deletes print data received from said information processing apparatus until receiving data indicating the end of job after notifying the apparatus of the cancellation of print job.

[Claim 12]

A storage medium storing program comprising:  
a determination step of, while generating print data, determining whether or not a notification of print cancellation has been received from a printer;  
a step of generating print data in a case where said determination step determines that the notification of print cancellation has not been received, and of stopping generation of the print data

and adding data indicating the end of job in a case where said determination step determines that the notification of print cancellation has been received.

[Claim 13]

5 The storage medium according to claim 12, wherein said printer deletes print data received from said information processing apparatus until receiving data indicating the end of job, after notifying the apparatus of the cancellation of print job.

10 [Detailed Description of the Invention]

[0001]

[Industrial Field of Utilization]

The present invention relates to a printing apparatus, an information processing apparatus, a 15 control method and a storage medium.

[0002]

[Prior Art]

Generally, as a transmission speed of interface between a host computer and a printer is higher than a 20 printing speed of the printer, the printer has a large-capacity reception buffer. Received data is temporarily stored in the reception buffer. The printer performs printing while it sequentially reads the data stored in the buffer.

25 [0003]

[Problems That the Invention Is to Solve]

If an error occurs in data transmission from the

host computer or a jam occurs in the printer, the host computer immediately stops the data transfer.

[0004]

However, on the printer side, regarding data 5 already stored in the reception buffer or an external buffer, as printing operation cannot be immediately stopped, unnecessary printing is continued.

[0005]

Further, if printing must be performed for a long 10 period as in the case of image drawing, even if an instruction is made to stop the printing operation, printing for the next file is not started until the unnecessary printing is completed. That is, waiting status is caused by the cancellation.

15 [0006]

This problem is solved by forcibly deleting the content of the reception buffer by turning the power of the printer off or resetting the printer. However, in an environment where printing can be performed from 20 plural host computers via a network or the like, when a user desires to delete his/her job, another user's print data may be stored in the reception buffer. In this case, the user may delete his/her job and further delete the other user's print job. The problem of 25 printing cancellation becomes more serious as the buffer has a larger capacity.

[0007]

Further, in recent printers, print data described in a page description language is interpreted. If the printer is reset when it has received data to the middle of one command, the sequence is shifted and even 5 normal printing cannot be performed.

[0008]

The present invention has been made in consideration of the above problems, and has its object to provide a printing apparatus and an information 10 processing apparatus, a printing system, a control method and a storage medium for quick cancellation of print job without any influence on other subsequent print jobs upon issuance of print cancel instruction.

[0009]

15 [Means of Solving the Problems]

To attain the object, the printing apparatus of the present invention has the following construction.

That is, provided is a printing apparatus for printing an image on a predetermined recording medium 20 based on a print job received from a higher-order apparatus, comprising:

instruction means for issuing a print cancel instruction;

25 searching means for, when the print cancel instruction is issued during the print processing based on the print job, searching a predetermined data indicating the end of job among print data, which has

not been processed, received after the reception of currently-processed data; and

control means for deleting print data received before the reception of the predetermined data searched 5 by said searching means, and for stopping print processing of the interested job.

[0010]

[Embodiment]

A preferred embodiment of the present invention 10 will now be described in detail in accordance with the accompanying drawings.

[0011]

Fig. 1 is a block diagram showing the construction of a printing system implementing the 15 present invention having a host computer 101 and a printer 102.

[0012]

In the present embodiment, the host computer 101 and the printer 102 are connected with each other via a 20 bidirectional communication interface such as an IEEE1284 interface, a USB interface or an IEEE 1394 interface.

[0013]

Print data is generated by the host computer 101, 25 transmitted via the bidirectional interface to the printer 102, and print-outputted. When a document or the like generated by an application program which

operates on the host computer is print-outputted, i.e., when an operation to perform printing is made by using a print menu of the application, data for printing is delivered from the application program to a print data generator 103 (generally corresponding to printer driver software), which generates print data appropriate to the printer 102. The print data is temporarily stored (spooled) in a print data buffer 104, and sequentially transmitted to the printer 102.

10 [0014]

If a printer status manager 106 determines that reception is possible, the printer 102 receives the print data and stores the data into a transmission/reception buffer 105. A print command interpreter 108 sequentially reads the print data from the transmission/reception buffer 105, interprets the data, then stores a bitmap image data in a print buffer (not shown), and instructs a print controller 110 to perform printing.

15 [0015]

When the printer 102 performs printing, if a user cancels the printing for some reason, the user selects "cancel printing" from a printer operation unit 107. A printer function manager 109 receives a notification 20 of print cancellation from the printer operation unit 107, and to stop the currently-processed printing, instructs the print controller 110 to stop the printing.

At this time, if paper feeding has been already started, image formation processing (exposure, development or the like in use of page printer such as a laser-beam printer, or printing processing by reciprocation of carriage in use of serial printer such as an ink-jet printer) is stopped, then the print sheet is discharged such that the processing from the cancellation to the paper discharge is made at a high speed. Further, the printer function manager 109 outputs a notification of print cancellation (including information to specify the print-cancelled job) to a printer status manager 106, and notifies the print command interpreter 108 of the cancellation of printing.

[0016]

- 15 The printer status manager 106 which has received the notification of print cancellation writes the content of the notification into the transmission/reception buffer 105 and immediately notifies the host computer 101 of the cancellation.
- 20 Further, the print command interpreter 108 which has been notified of the print cancellation searches data, received after the reception of currently-interpreted data, stored in the reception buffer, for an end mark indicating the end of print job, then deletes the data before the mark, and updates the position of interpretation to an address position next to the end mark.

[0017]

Accordingly, if the next job is stored in the transmission/reception buffer 105, the print job is immediately started.

5 [0018]

Note that if print data is high-resolution photographic data or the like, as enormous amount of data is stored, all the data cannot be stored in the transmission/reception buffer 105. When such massive 10 amount of data has been received and printing processing (image bitmapping in the print buffer or the like) is performed, if a user performs a print cancel operation, the print command interpreter 108 waits for storage of end mark into the transmission/reception 15 buffer 105, i.e., the print command interpreter 108 waits until it receives an end mark.

[0019]

However, if an enormous amount of print job is processed, as reception is continued until an end mark 20 indicating the end of the print job is received, time is wasted.

[0020]

In the present embodiment, if the print data generator 103 operating on the host computer 101 25 receives the above-described notification of print cancellation while generating print data from data for printing delivered from a higher-order application

program, the print data generator 103 stops generation of print data if the cancelled print job included in the notification corresponds with the job of currently-processed print data. The print data generator 103 5 stores an end mark into the print data buffer 104, thereby reduces time for the printer 102 to find the end mark. This removes waiting for print data generation caused by print cancel processing.

[0021]

10 Fig. 4 shows a particular block diagram of the printing apparatus according to the present embodiment to realize the above processing, and the operation of the apparatus will be described with reference to the flowchart of Fig. 2 (processing for one print job).

15 [0022]

Note that in Fig. 4, reference numeral 1 denotes a CPU which controls the overall apparatus; 2, a ROM in which an operation processing procedure of the CPU (including a processing program according to the 20 flowchart of Fig. 2); 3, a RAM used as a work area for the CPU 1, having a transmission/reception buffer 3a (corresponding to the transmission/reception buffer 105 in Fig. 1); 4, an interface for bidirectional communication with the host computer, such as the IEEE 25 1284 interface, the USB interface or the IEEE 1394, as described above.

[0023]

Numeral 5 denotes an operation unit corresponding to the printer operation unit 107 in Fig. 1; 6, a print buffer in which a bitmap image is stored; and 7, a printer engine which performs actual printing. In use of laser-beam printer, the printer engine 7 is constructed with a laser light emitting device, a polygon mirror and a motor for rotation of the mirror, an electrostatic drum, a fixer, a paper-feed motor, various sensors and the like. In use of ink-jet printer, the printer engine 7 is constructed with a carriage carrying a printhead, a motor for scanning the carriage, a paper-transfer motor and various sensors. Note that the printer status manager 106, the print command interpreter 108, the printer function manager 109 and the print controller 110 in Fig. 1 are realized by the CPU 1 and the programs stored in the ROM 2 in Fig. 4, however, they may be realized as independent circuits or processors.

[0024]

In Fig. 2, first, at step S201, it is determined whether or not printing has been completed. If the printing has been completed (YES), the process ends, in preparation for the start of operation for the next job. If the printing has not been completed (NO), the process proceeds to step S202, at which print processing (reading data from the transmission/reception buffer, formation of bitmap

image, and print-output processing when a predetermined amount of bitmap image has been stored) is executed. Next, at step S203, it is determined whether or not a notification of job cancellation has been received. If 5 NO, steps S201 to S203 are repeated, and when the job has been normally completed, the process ends.

[0025]

During the print processing, if it is determined that a print cancel instruction has been received from 10 the operation unit, the process proceeds to step S204, at which a notification of job cancellation, to which information to specify the currently-processed job is added, is sent to the host computer.

[0026]

15 At step S206, a pointer is advanced from the print data processed upon reception of the print cancel instruction to the subsequent data, and it is determined whether or not the subsequent data is an end mark. If the data is not an end mark, the process 20 proceeds to step S205, at which the data is deleted, and this processing is repeated until an end mark is found.

[0027]

When an end mark is detected, and the pointer is 25 set to data subsequent to the end mark for the next job, and the process ends.

[0028]

On the other hand, on the host computer side, processing as shown in Fig. 3 is performed. Note that as the host computer 101 is a general personal computer as hardware, its particular block construction is not 5 shown here, but the content of the processing procedure of a printer driver which functions as the print data generator 103 will be described.

[0029]

First, at step S301, it is determined whether or 10 not generation of print data, based on data delivered from a higher-order processing (application), has been completed. If it is determined that the generation of print data has been completed, the process proceeds to step S305, at which an end mark indicating the 15 completion of the job is added to the data, and the process ends.

[0030]

Further, if it is determined at step S301 that the generation of print data has not been completed, 20 the process proceeds to step S302, at which print data is generated. At step S303, it is determined whether or not a notification of print job cancellation has been received from the printer, and if YES, it is determined whether or not the job of the notification 25 of cancellation corresponds with the currently-processed job. If no notification of cancellation has been received or it is determined that the notification

of cancellation has been made for another job which does not correspond with the currently-processed job (print job already output-processed in the past), the process returns to step S301, to repeat the above 5 processing.

[0031]

On the other hand, if it is determined at step S303 that the notification of cancellation has been made for the currently-processed job, the process 10 proceeds to step S304, at which the print data generation processing is stopped, then an end mark is immediately added to the data at step S305, and the print data generation processing is terminated.

[0032]

15 As a result, in accordance with the present embodiment, when the user performs an operation to cancel printing during printing by the printer, as data is deleted until an end mark indicating the job end of the current job is found in the reception buffer, the 20 print job can be cancelled at a high speed, and print processing for the subsequent print job can be safely started at a high speed.

[0033]

Further, when a print job of comparatively large 25 data amount which may overflow from the reception buffer is executed, even if the job is cancelled, the host computer side stops print data generation

processing for all the data for printing, and immediately sends an end mark. Accordingly, cancellation for a print job of a large data amount can be made at a high speed.

5 [0034]

In the present embodiment, even in the case where the host computer and the printer are connected with each other via a bidirectional communication interface, the computer and the printer are one-to-one connected.

10 To use the printer as a network printer, a network interface card may be incorporated in the printer. In this case, the printer performs printing based on print data from a number of host computers. When an instruction to cancel printing is made, the host  
15 computer which transmitted the currently-processed is notified of the print cancellation.

[0035]

[Effect of the Invention]

As described above, according to the present  
20 invention, when a print cancel instruction is made, the print job can be quickly cancelled without any influence on the subsequent other print jobs.

[Brief Description of the Drawings]

[Fig. 1]

25 Fig. 1 is a block diagram showing the configuration of a printing system having a host computer and a printer.

[Fig. 2]

Fig. 2 is a flowchart showing the flow of print cancel processing on the printer side.

[Fig. 3]

5 Fig. 3 is a flowchart showing the flow of print cancel processing on the host computer side.

[Fig. 4]

Fig. 4 is a block diagram showing the construction of a printing apparatus according to the 10 present embodiment.

[Explanation of the Numerals]

- 101 host computer
- 102 printer
- 103 print data generator
- 15 104 print data buffer
- 105 transmission/reception buffer
- 106 printer status manager
- 107 printer operation unit
- 108 print command interpreter
- 20 109 printer function manager
- 110 print controller

[Type of the Document] Drawings

Type of the Document DRAWINGS

FIG. 1

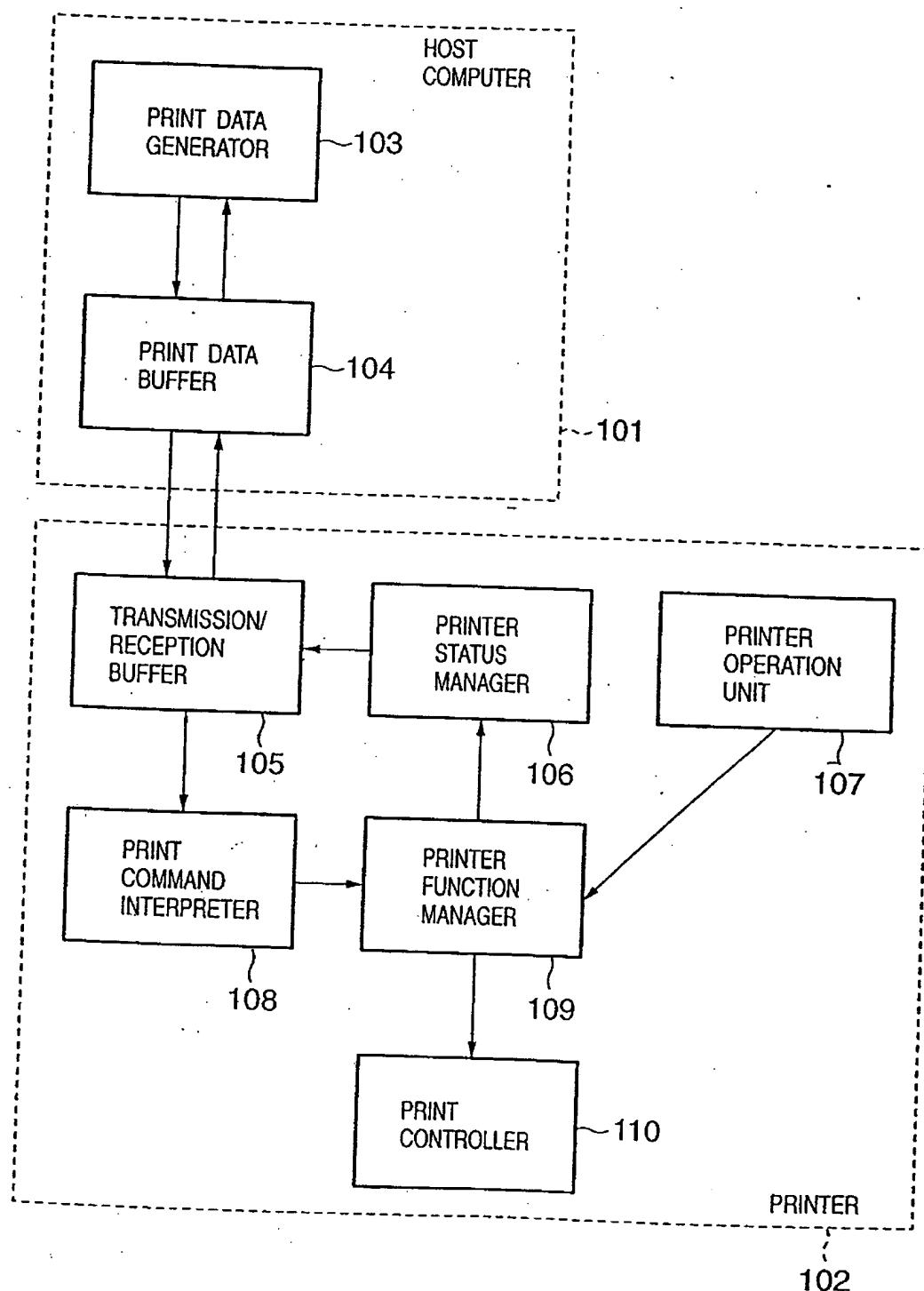




FIG. 2

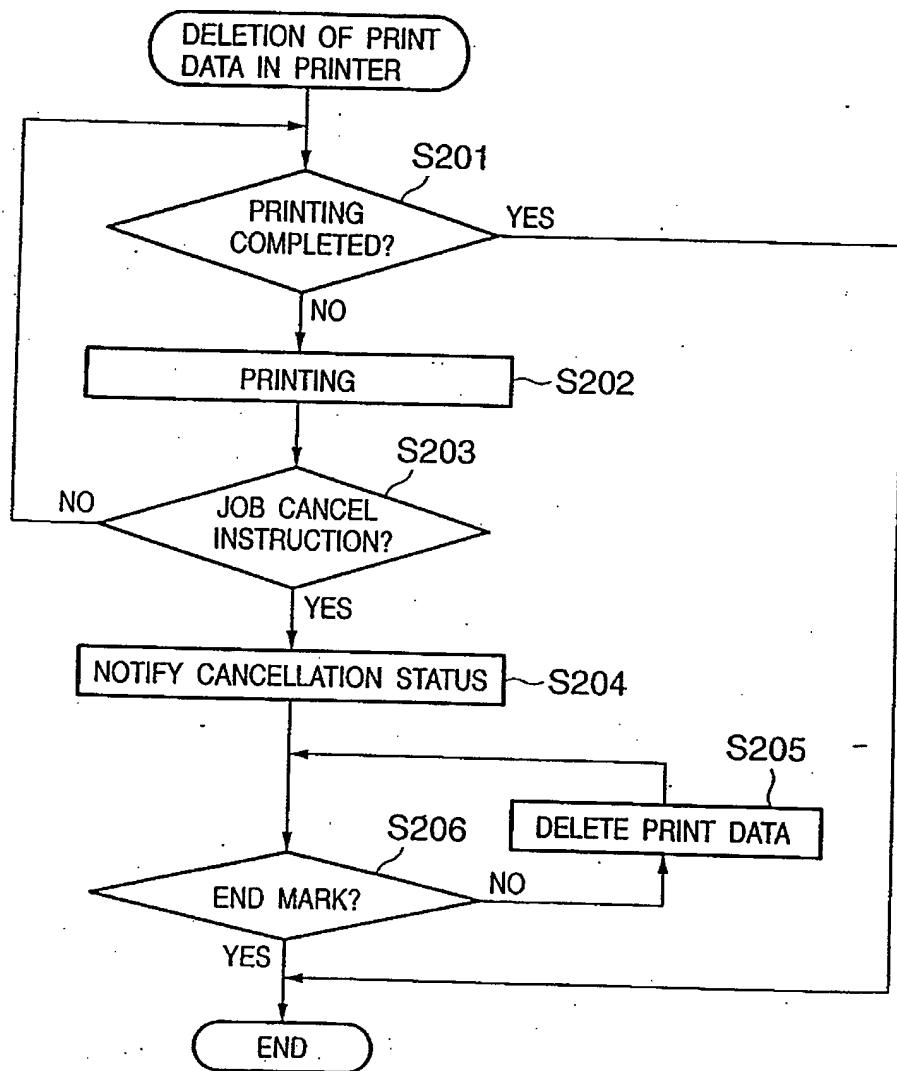




FIG. 3

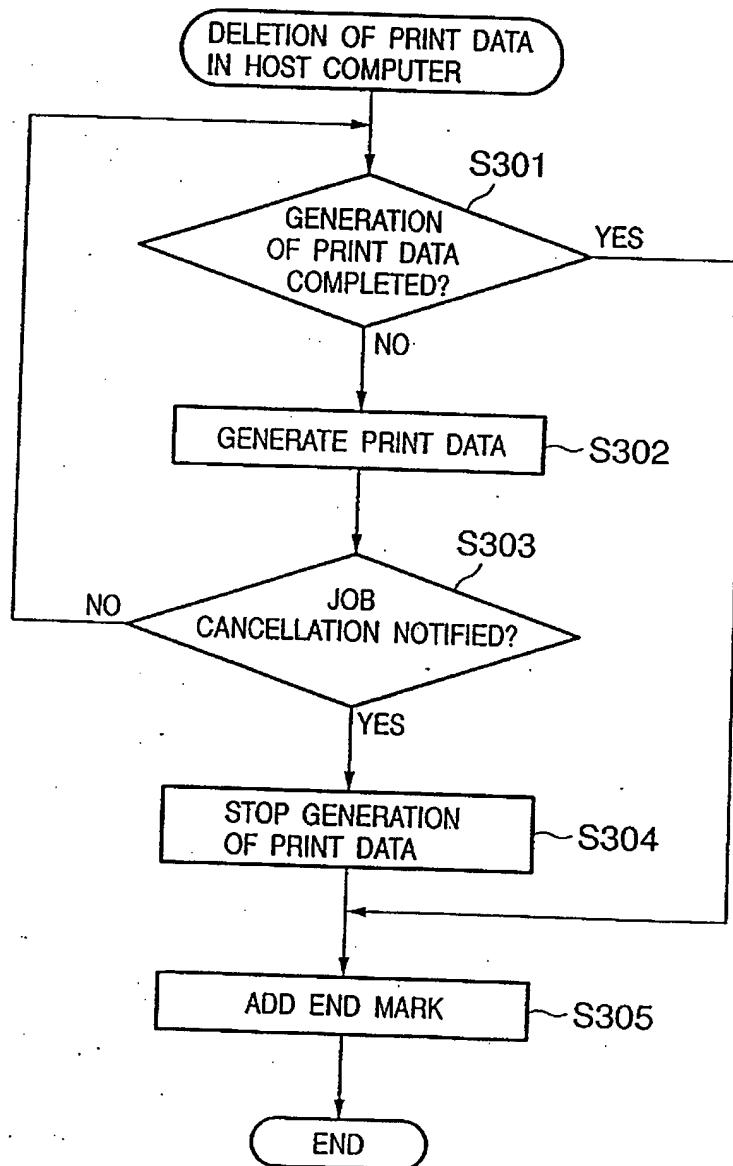
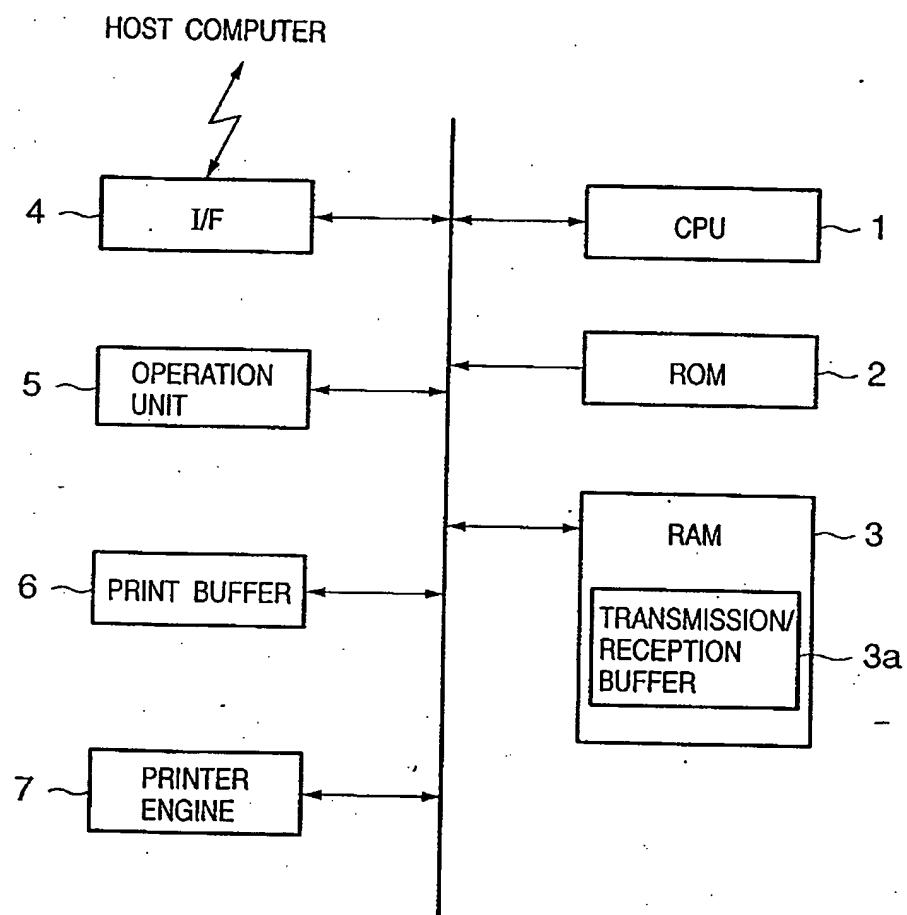




FIG. 4



[Type of the Document] Abstract

[Abstract]

[Problems]

A printing apparatus which quickly cancels a  
5 print job without any influence on the subsequent other  
print jobs when a print cancel instruction is issued.

[Means of Solving the Problems]

During printing, if a print cancel instruction is  
inputted from a printer operation unit 107, a printer  
10 function manager 109 notifies a print command  
interpreter 108 of the cancellation. The print command  
interpreter 108 searches data processed at that time in  
a transmission/reception buffer for an end mark command  
indicating the end of the cancelled job. Then the  
15 print command interpreter 108 deletes the data before  
the end mark command.

[Selected Drawing] Fig. 1